NAME

gensurf - generate a RADIANCE or Wavefront description of a curved surface

SYNOPSIS

gensurf mat name 'x(s,t)' 'y(s,t)' 'z(s,t)' m n [**−e expr**][**−f file**][**−s**][**−o**]
gensurf mat name 'x(s,t)' 'y(s,t)' dfile m n [**−e expr**][**−f file**][**−s**][**−o**]
gensurf mat name dfile dfile dfile m n [**−s**][**−o**]

DESCRIPTION

Gensurf produces either a RADIANCE scene description or a Wavefront .OBJ file of a functional surface defined by the parametric equations *x(s,t)*, *y(s,t)*, and *z(s,t)*. The surface normal is defined by the right hand rule as applied to *(s,t)*. *S* will vary from 0 to 1 in steps of *1/m*, and *t* will vary from 0 to 1 in steps of *1/n*. The surface will be composed of *2*m*n* or fewer triangles and quadrilaterals. The expressions are of the same type used in RADIANCE function files. Auxiliary expressions and/or files may be specified in any number of *−e* and *−f* options. The *−s* option adds smoothing (surface normal interpolation) to the surface. The *−o* option produces a Wavefront .OBJ file rather than a RADIANCE scene description. This is most useful as input to the *obj2mesh(1)* program for producing a compiled mesh. A single "usemtl" statement will appear at the beginning of the .OBJ output, echoing the modifier given on the command line.

Rough holes may be cut in the mesh by defining a valid(s,t) function. Where this function is positive, polygon vertices will be produced. Where it is negative, no geometry will be output. Surface normal interpolation will ignore any invalid vertices.

The second invocation form reads z data values from the file *dfile*. This file must give either m*n or (m+1)*(n+1) floating point z values. If m*n values are given, then the values correspond to the centroid of each quadrilateral region. If (m+1)*(n+1) values are given, then the values correspond to the vertices of each quadrilateral region. The ordering of the data in the file is such that the s values are changing faster than the t values. If a minus ('-') is given for *dfile*, then the values are read from the standard input.

The third invocation form is used to read coordinate triplets from a file or the standard input. The three *dfile* arguments must all be the same, and the corresponding file must contain three floating point values for each point location. The ordering and other details are the same as those described for z value files above.

EXAMPLE

To generate a tesselated sphere:

```
gensurf crystal ball 'sin(PI*s)*cos(2*PI*t)' 'cos(PI*s)' 'sin(PI*s)*sin(2*PI*t)' 7 10
```

To generate a 10x20 smoothed height field from 12 recorded vertex z values:

```
gensurf dirt ground '10*s' '20*t' height.dat 2 3 −s
```

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BUGS

The smoothing operation requires that functions be defined beyond the [0,1] boundaries of s and t.

SEE ALSO

genbox(1), genrev(1), genworm(1), icalc(1), obj2mesh(1), obj2rad(1), rpict(1), rvu(1), xform(1)